

ARJUNA JEE 2023

Atomic Structure

DPP-09

1. Which of the following sets of quantum numbers is correct for an electron in 4f-orbital?
- (1) $n = 3, l = 2, m = -2, s = +\frac{1}{2}$
 (2) $n = 4, l = 4, m = -4, s = -\frac{1}{2}$
 (3) $n = 4, l = 3, m = +1, s = +\frac{1}{2}$
 (4) $n = 4, l = 3, m = +4, s = +\frac{1}{2}$
2. The number of waves in an orbit are
- (1) n^2 (2) n
 (3) $n - 1$ (4) $n - 2$
3. The total number of orbitals for $(n + 1) = 4$ is
- (1) 4 (2) 16
 (3) 32 (4) 9
4. How many electrons in an atom can have $n = 4, l = 2, m = -2$ and $s = +\frac{1}{2}$?
- (1) 1 (2) 2
 (3) 5 (4) 10
5. The electrons identified by quantum numbers n and l ,
- (i) $n = 4, l = 1$ (ii) $n = 4, l = 0$
 (iii) $n = 3, l = 2$ (iv) $n = 3, l = 1$
- can be placed in the order of increasing energy from the lowest to highest, as
- (1) iv < ii < iii < i (2) ii < iv < i < iii
 (3) i < iii < ii < iv (4) iii < i < iv < iii
6. The orbital angular momentum of a 4p electron will be
- (1) $4 \cdot \frac{h}{2\pi}$ (2) $\sqrt{2} \cdot \frac{h}{2\pi}$
 (3) $\sqrt{6} \cdot \frac{h}{2\pi}$ (4) $\sqrt{2} \cdot \frac{h}{4\pi}$
7. For which of the following sets of quantum numbers, an electron will have the highest energy?
- | | n | l | m | s |
|-----|-----|-----|-----|------|
| (1) | 3 | 2 | 1 | -1/2 |
| (2) | 4 | 3 | -1 | +1/2 |
| (3) | 4 | 1 | -1 | +1/2 |
| (4) | 5 | 0 | 0 | -1/2 |
8. Pauli's exclusion principle states that
- (1) Pairing of electrons does not occur in orbitals of the same subshell until each of them is first singly occupied.
 (2) Orbitals are filled in order of their increasing energy.
 (3) No two electrons in an atom can have the same set of four quantum numbers
 (4) None of these.
9. The orbital diagram in which the Aufbau principle is violated
- (1) $2s^2 2p^2$ (2) $2s^1 2p^3$
 (3) $2s^2 2p^3$ (4) $2s^1 2p^3$
10. Which one is a wrong statement?
- (1) total orbital angular momentum of electron in s-orbital is equal to zero.
 (2) An orbital is designated by three quantum numbers while an electron in an atom is designated by four quantum number.
 (3) The electron configuration of N atom is $1s^2 2s^2 2p_x^1 2p_y^1 2p_z^1$
 (4) The value of m for d_{z^2} is zero.
11. If the electronic structure of the oxygen atom is written as $1s^2, 2s^2$ it would violate
- (1) Uncertainty principle
 (2) Pauli's exclusion principle
 (3) Hund's rule
 (4) Aufbau principle.
12. Which of the following configuration is violating Pauli's exclusion principle?
- (1) $2s$ $2p$
 (2) $2s$ $2p$
 (3) $2s$ $2p$
 (4) (2) and (3)

Answer Key

1. (3)
2. (2)
3. (1)
4. (1)
5. (1)
6. (2)

7. (2)
8. (3)
9. (2)
10. (3)
11. (3)
12. (2)



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